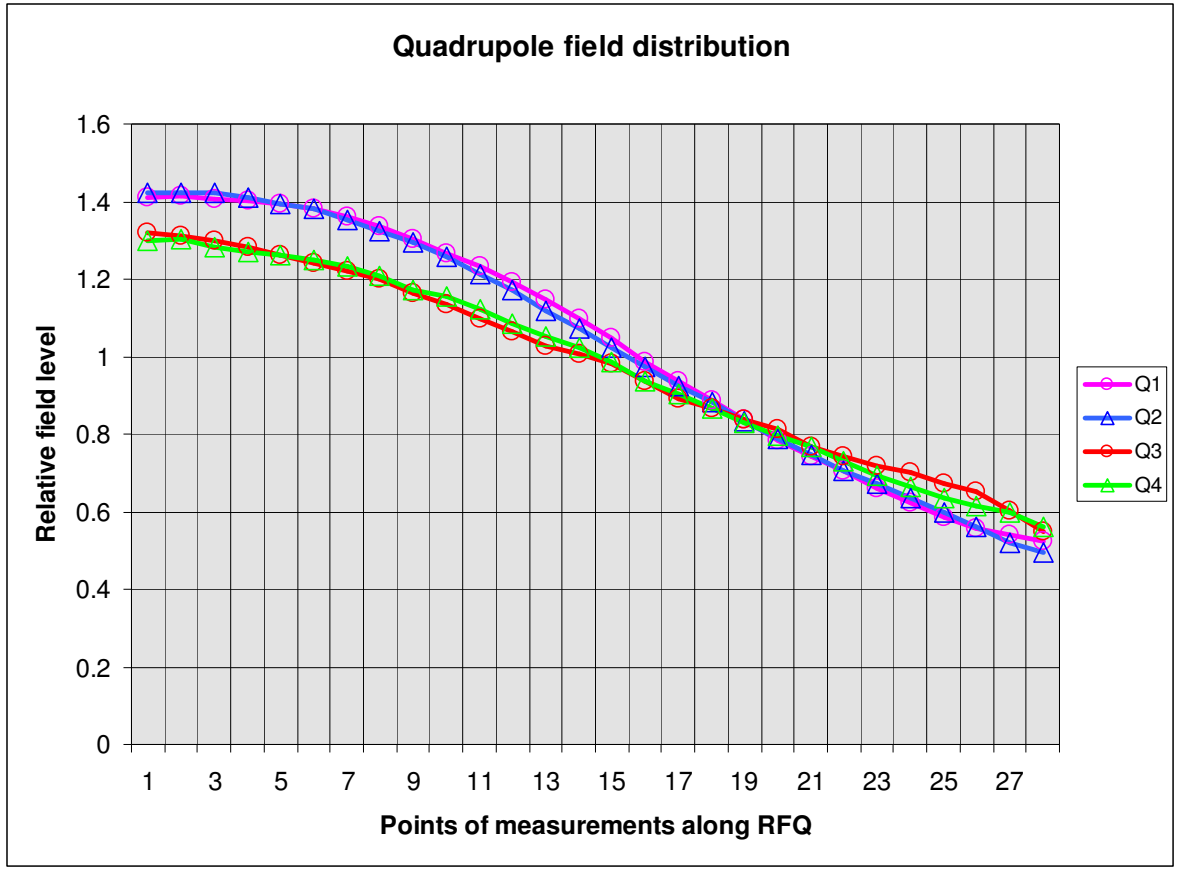
RFQ status

December 20, 2007

Gennady Romanov

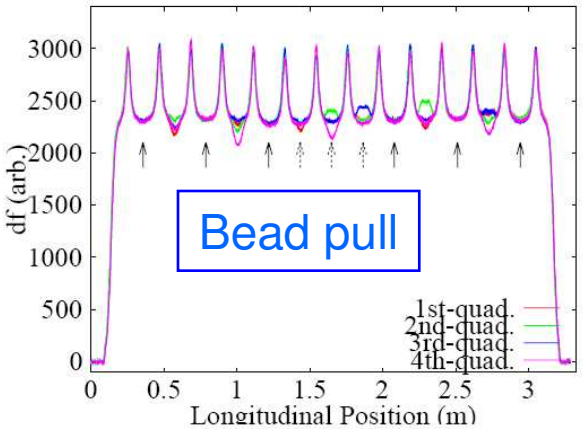
Field flatness evaluation of our RFQ just after its assembly has been completed



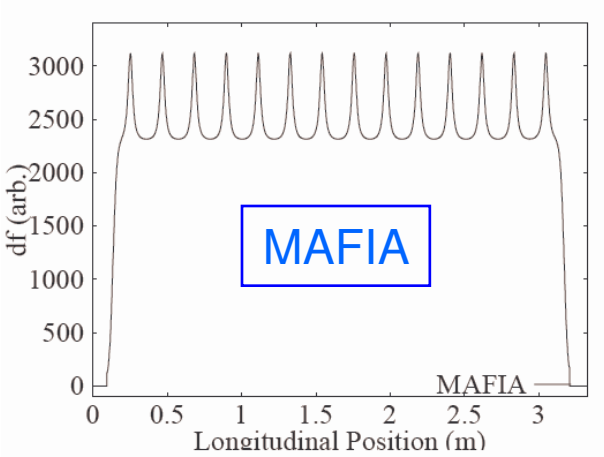
Problem: huge tilt of field and AccSys can not tune (flatten) it.

Source of problem: detuned RFQ ends because of not correct dimensions of **cutbacks**.

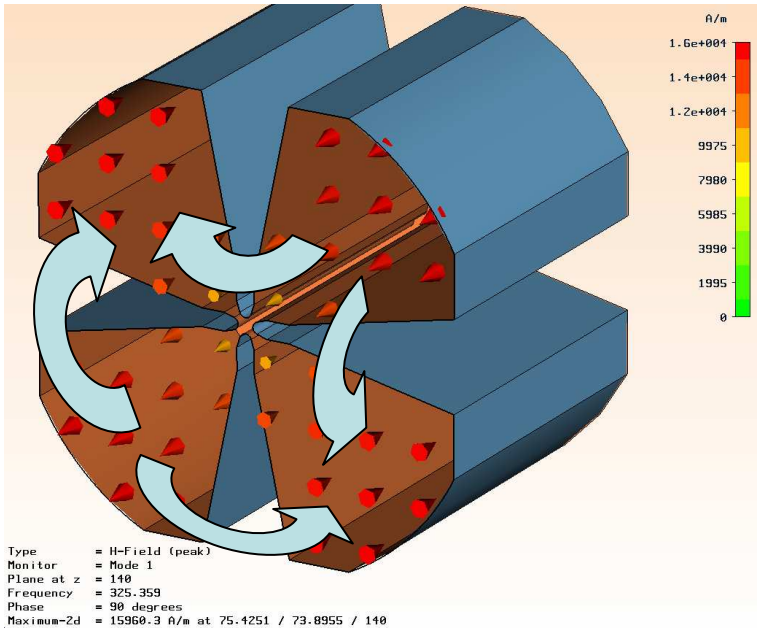
J-PARC example

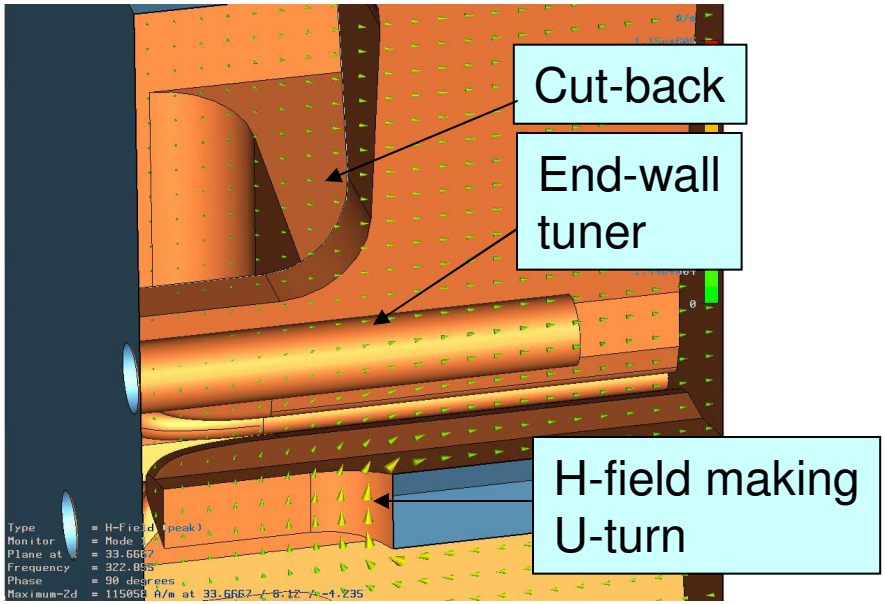


±0.6% both longitudinally and azimuthally were easily achieved.



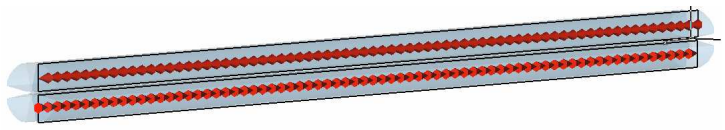
What is cutback and what is for

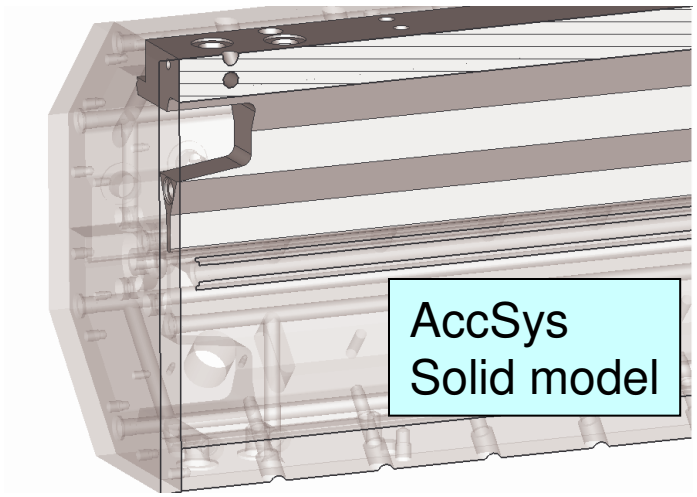




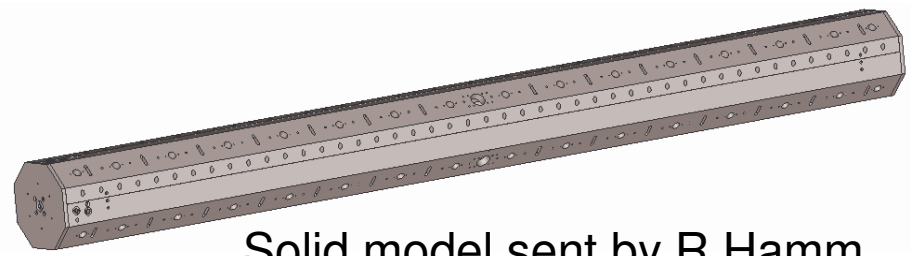
Magnetic field distribution of operating quadrupole mode (H_{210}, RFQ is H-type structure).

The cut-backs are windows for magnetic flux to make U-turn.

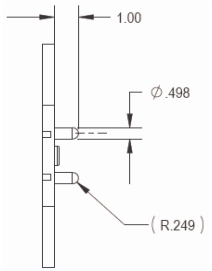


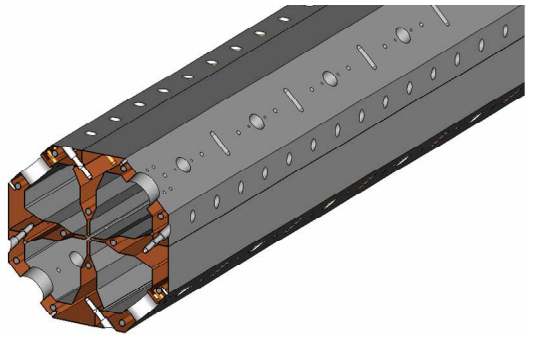


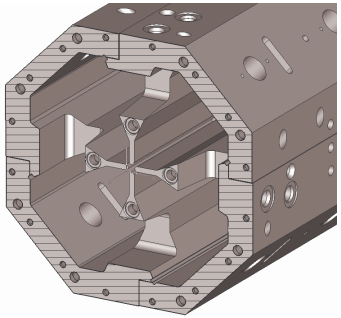
Introducing end-wall tuners and matchers

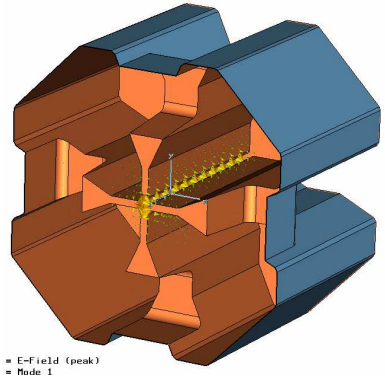


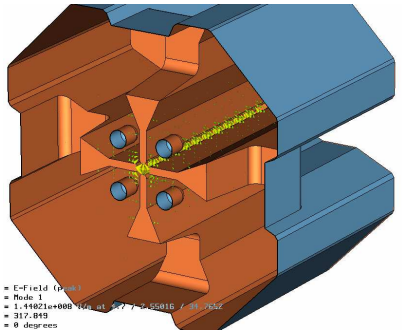
Solid model sent by R.Hamm

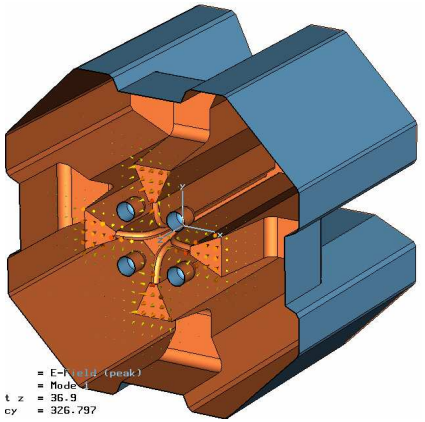


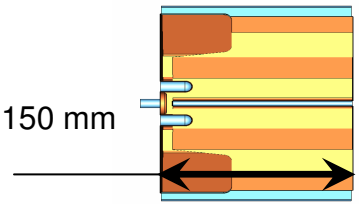








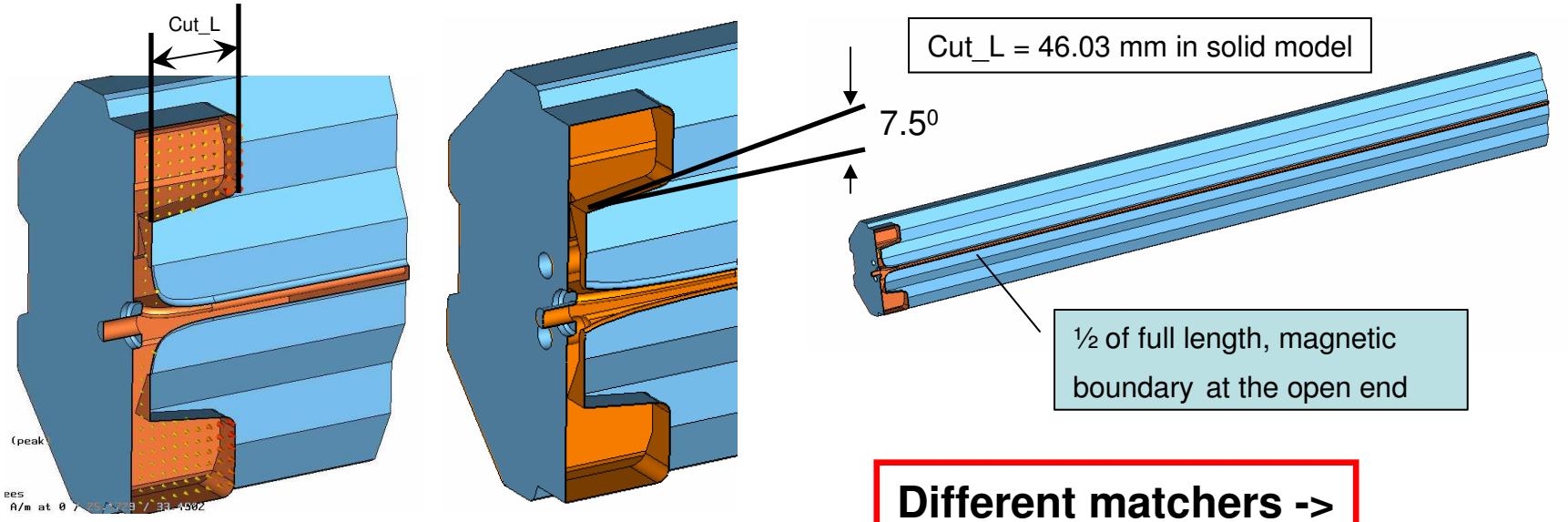




319 MHz -> 318 MHz -> 327 MHz (close, but need to be tuned)

Frequency goes up, because the matcher reduces capacitive loading.

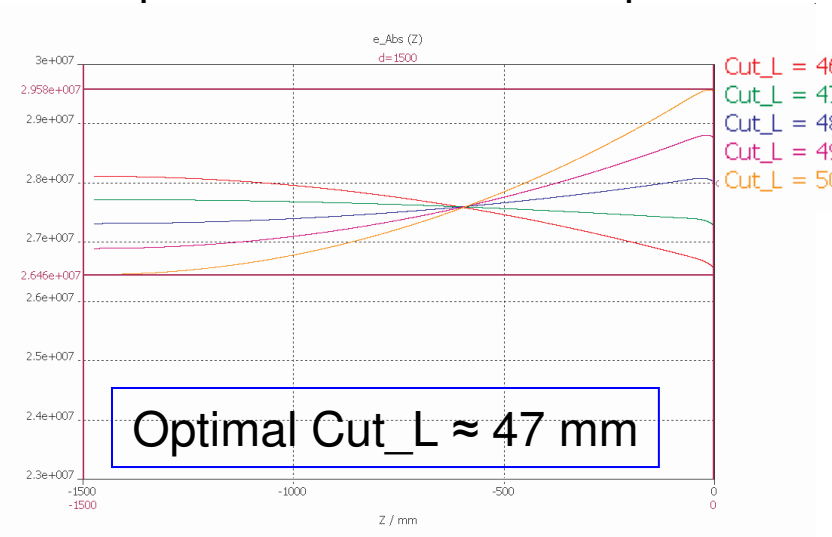
Field flatness and tuning of cut-backs (as it was a year ago)

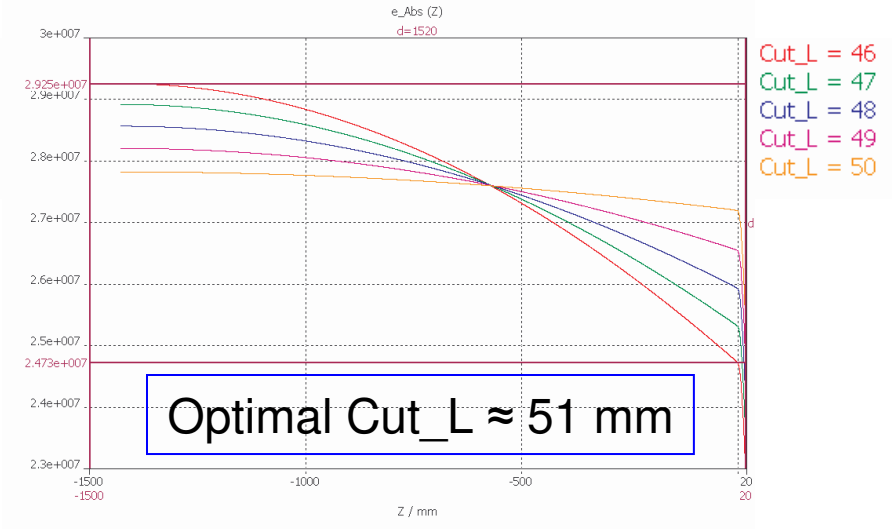


Input matcher

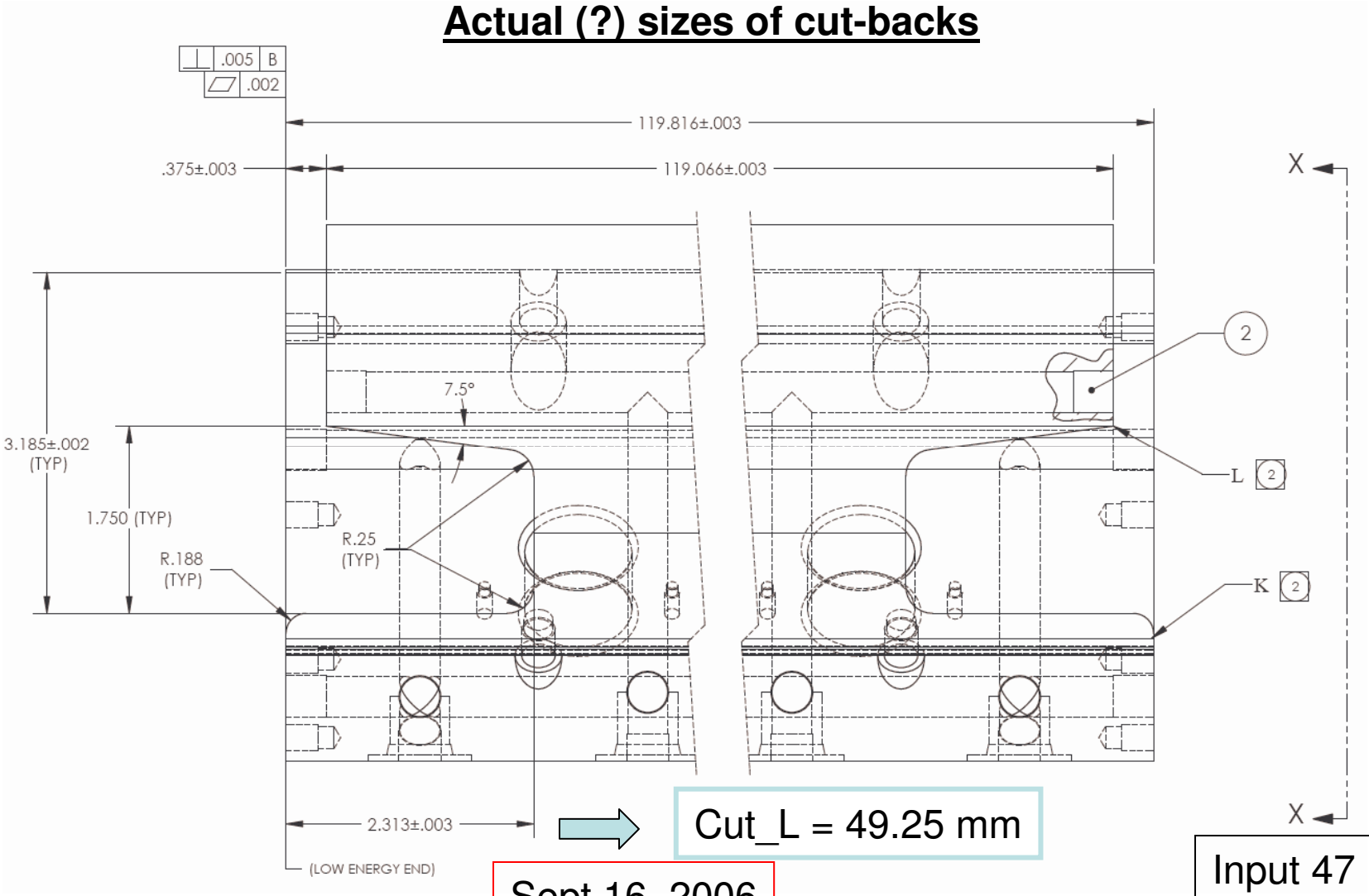
Output matcher

Different matchers -> Different cut-backs





Actual (?) sizes of cut-backs



Cut_L = 49.25 mm

Sept.16, 2006

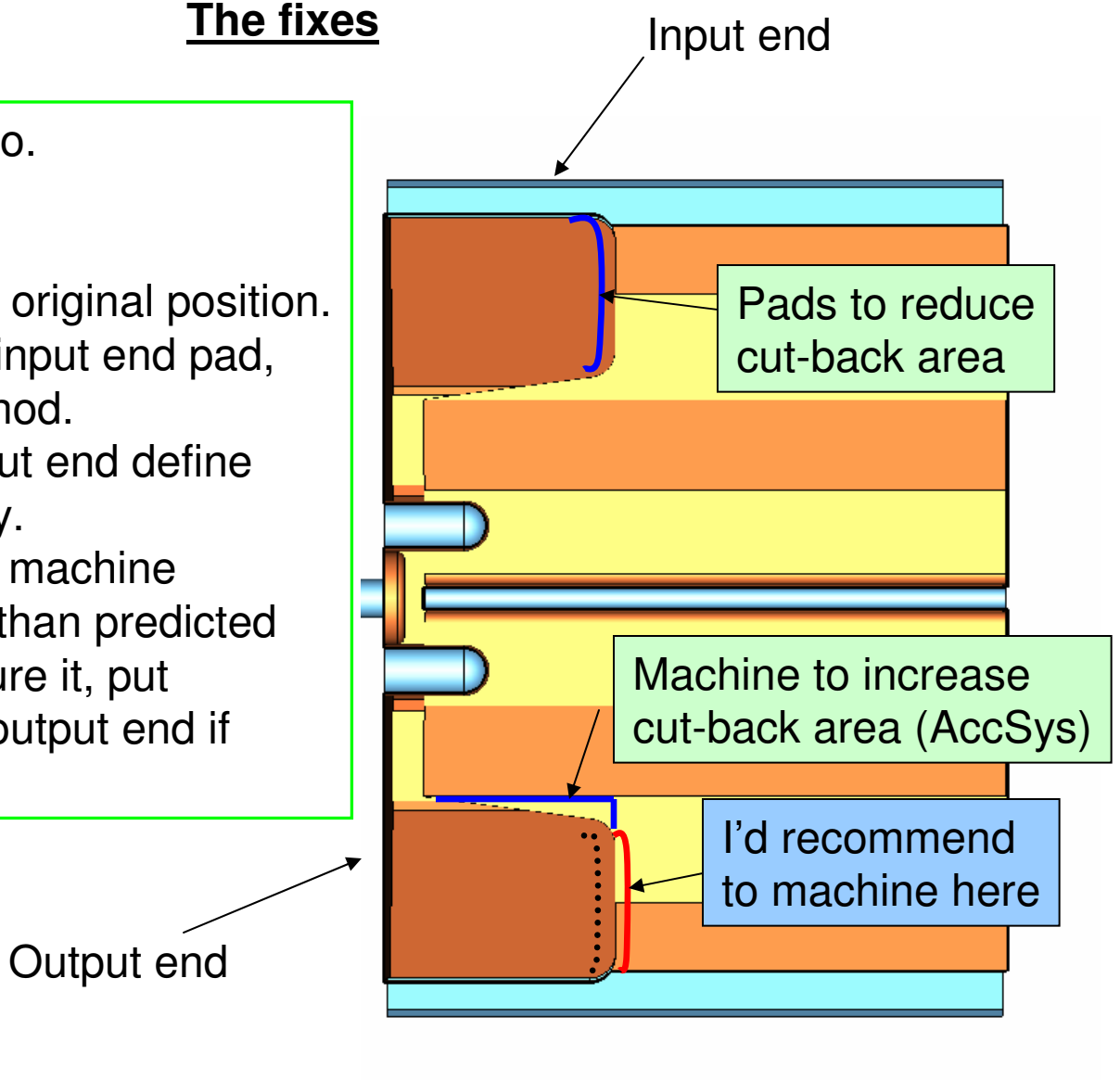
Input 47
Output 51

The fixes

AccSys knows what to do.

My tip would be:

- Return all tuners to the original position.
- Find right thickness of input end pad, using “cut and try” method.
- Using thin pad for output end define coefficient of sensitivity.
- Disassemble RFQ and machine cut-back slightly **more** than predicted
- Assemble RFQ, measure it, put correcting pads at the output end if needed



Subject:
RE: RFQ for FNAL
From:
Bob Hamm <rhamm@linacs.com>
Date:
Thu, 10 Aug 2006 15:40:51 -0700
To:
Gennady Romanov <gromanov@fnal.gov>

Gennady -

Thanks very much for the results you sent. I believe that the cut-back distance may be much closer to correct than you suspect, as we use dipole tuners on the endplates that lower the end frequency. I am attaching a copy of the endplate drawing showing the location of the 4 end tuners. We usually stick them in 1 inch on each end of the resonator to start the tuning process and use them first to correct any tilt in the fields before individually adjusting them to separate the dipole fields. Can you include these in the calculation?

Also, on the actual vane fabrication drawings we do include a .06 inch radius on the cut-back as you have shown. What radius did you use?

Again, thanks for all your help, as this will save a lot of time on the schedule that we would have to use machining the cutback in steps to get it correct.

Regards,
Bob

Robert W. Hamm, PhD
CEO & President